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ATTENUATION PHENOMENA IN THE IONOSPHERE

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"Ueber daempfungsvorgaenge in der Ionosphaere
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The work deals with certain attenuation problems based on theoretical knowledge in connection with field-strength measurements conducted by the author in 1943 and 1944 with the then Office of Wave Propagation of the Research Institute of the Deutsche Reichspost, Munich. The results of the investigations were as follows.

(1) The "penetration attenuation" and the D-layer attenuation are superimposed upon each other during daytime. After sunset essentially only the "penetration attenuation" remains; (2) The "penetration attenuation" was found to be in nearly linear frequency-dependence; (3) The day-to-day fluctuations of the maximum daytime attenuation are quite considerable and are basically different on the high and low frequencies of the shortwave band during daytime, depending on their different causes. After sunset, however, there is a considerable degree of parallelism in conformity with the fact that here only the "penetration attenuation" is effective. The "penetration attenuation", which increases with higher frequencies, reflects the corpuscular radiation incidence from the sun, whereas the D-layer attenuation presumably varies with the wave radiation emanating from the sun; (4) the seasonal variations of the attenuation was found to be differing in the high and low frequencies. The D-layer attenuation ~~was~~ increases with higher ionization from winter to summer. Presumably also the "penetration attenuation" increases in summer. The observed decrease was presumably caused by a shielding of the E-reflection through abnormal E-layer since then the losses of the "penetration attenuation" cease to exist; (5) On the 1000-km-transmission distance, during numerous field-strength measurements on the 25-m band during sunset, only 25 percent so-called "declines" (Unter-range) were determined, i.e. only in these cases a severe widening of the upper frequency band by the limiting frequencies was to be expected. In the other cases the attenuation influence became apparent, with the field strength slowly falling below the sensitivity range of the receiver (i.e., into the range of stray radiation). It is noteworthy that "declines" never occur in transoceanic transmissions.

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